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OF THE
AMERICAN FISHERIES SOCIETY

JUNE, 1915

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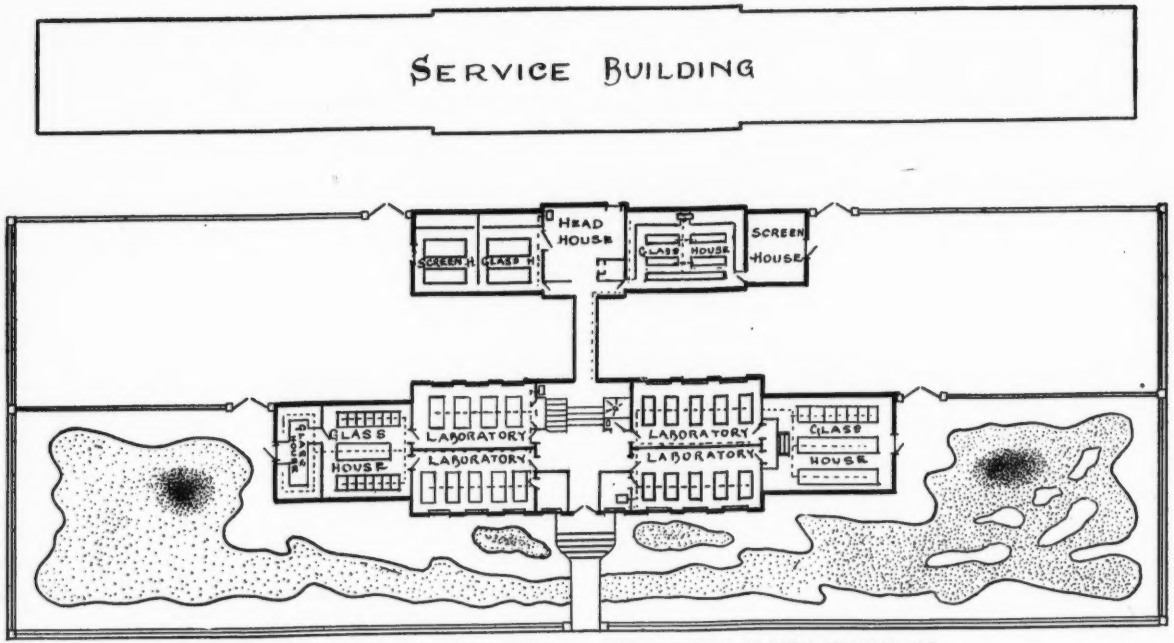

PLAN OF PROPOSED VIVARIUM BUILDING, UNIVERSITY OF ILLINOIS, URBANA, ILL.

TRANSACTIONS

of the

American Fisheries Society

"To promote the cause of fish culture; to gather and diffuse information bearing upon its practical success, and upon all matters relating to the fisheries; to unite and encourage all interests of fish culture and the fisheries; and to treat all questions of a scientific and economic character regarding fish."

VOLUME XLIV, NUMBER 3

1914-1915

Edited by The Recording Secretary

JUNE, 1915

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CONTENTS

AN EXPERIMENTAL PLANT OF INTEREST TO FISH CULTURISTS

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Zoological Laboratory, University of Illinois.

It is my intention to call to your notice a new movement in connection with the investigation of problems concerning fish culture. The plan has been formulated at the University of Illinois, and it is hoped that it will be carried to completion very soon. The prominence of the fisheries industry and fish culture, the importance of general problems involved in the life and habits of fish, and the growing interest in fish conservation have led to a consideration of the need of determining the fundamental principles connected with the home life of the fish, their reproduction, growth, and adult life under normal conditions. Many years of study on fish problems are recorded in the publications of national and state commissions, bureaus, and societies of various kinds. The greater part of this activity has been connected with taking and guarding the spawn, and raising the young. Between the United States government, and the various state organizations, many experiment stations are devoting their entire energies to the problem of obtaining fish eggs, hatching young fish, and replanting them in the various waters. The amount of work that has been devoted to this problem is enormous, and the total expenditures for such purposes, if brought together and summed up, would reach a figure calculated to astound even one most familiar with the question, and with the actual financial expenditures of these various stations.

Many have come to appreciate, and doubtless you in this organization most of all, that these stations are doing a rather one-sided work. I would not be understood as

minimizing in the slightest degree the splendid results that have come from their activity, or the ability and care that a multitude of superintendents and helpers have devoted to make their operations successful; but they have thus far contented themselves with the consideration of a single phase in the activity of the fish. They have depended on more or less general, and often imperfect statements concerning the natural conditions of reproduction, while they have been entirely ignorant of the other factors in the environment of the fish. So far as I know, the consideration of other factors in fish life has been limited to somewhat fragmentary and periodic studies by individual men connected with various fish bureaus and stations,—to the work of a few state surveys (notably the Illinois Natural History Survey, and the Wisconsin Natural History Survey), and to the work of the United States Bureau of Fisheries. The latter deserves prominent mention in this connection. Under the direction of the present efficient Commissioner of Fisheries, the scientific work of the Bureau has been carried on with increasing success for a long period of years; and the results are augmented by the efforts of numerous regular and special scientific investigators. These form a substantial foundation for our knowledge of fish life and habits. Certainly every member of this Society hopes that the work of the Bureau may be continued and extended along these lines already so well inaugurated; and that our national Congress may be favorable to granting adequate sums for the prosecution of this work. Its fundamental importance cannot be questioned; its brilliant successes cannot be doubted.

But, with all this, the situation is as yet rather poor when we compare conditions as they exist in the fisheries field, with those in agriculture. In every state one or more agricultural experiment stations are maintained for the continuous and exclusive investigation of agricultural problems. Experiments on plants and animals are inaugurated and followed out for long periods of time, giving opportunity for the study of complete cycles of existence, and for the determination of the factors which influence

favorably and unfavorably the development of all sorts of living things. Such an experiment station has not as yet been established to deal with the problems of the fisheries. The famous Woods Hole Station, established through the efforts of the distinguished United States Commissioner of Fisheries, Spencer Fullerton Baird, comes perhaps the nearest to meeting the conditions that obtain in agriculture; yet the force of scientific investigators is at work there only during a portion of the year, whereas the rest of the time the plant is utilized as a hatchery.

In my opinion, the tendencies of our universities are in a certain degree responsible for this neglect of aquatic life. In the various college laboratories of departments of natural history, experiments of the most diverse kinds are being carried on constantly. Most of these experiments concern problems of a rather theoretical character. It is the effort of pure science to establish and analyze conditions for existence in the broadest sense, and all groups of animals serve only so far as they are adapted for the testing of theoretical questions, or are related to problems of economic importance to the community. The agricultural interests are fundamental and their importance has served to direct the attention of scientific men to the wisdom of determining the features that they have desired to have investigated. Recently there has been a movement in our universities to inaugurate a more careful study of the conditions under which animals and plants actually live and the importance of individual factors among these conditions for the welfare of the organism. The Board of Trustees of the University of Illinois has voted to spend a sum of money in the construction of a plant for experiment work on animals. Strictly speaking this is to be devoted to an effort to solve all problems of animal existence, both such as are related to terrestrial existence affecting prominently the land animals with which the agriculturist works, and such as concern aquatic existence being thus of first importance to the fish culturist. An examination of the plan will show the general way in which these problems

are to be attacked, and the particular advantages for such an attack that are offered by the proposed installation. (See Fronstispiece.)

A tract of land, about 130 x 350 feet, has been purchased, on the edge of the campus. It is proposed to erect in the center of this plot a vivarium building with greenhouse wings and to construct on the land in front of the house a culture pond for fish work. An examination of the sketch plan given here will illustrate the essential features in the construction of the house. It is a rectangular structure with a hallway running through the center, from north to south and opening into four laboratories, one at each corner. East and west from the main house project glass houses of ordinary greenhouse construction, which will be utilized for growing animals, but will of course hold plants although these are introduced only for the purpose of furnishing food and shelter for the animals, or to give to the culture animals as nearly as possible the same conditions as they find in the outside world. A similar greenhouse construction projects from the rear of the laboratory structure. Considering the division of space, one may see that each of the four large laboratories has a greenhouse directly connected with it. This plan leaves the north one-third of the block, which lies next the interurban railroad track, to be utilized as a university storehouse, for unloading freight, receiving supplies, etc. It has nothing to do with our project.

It is important to notice the general equipment of the laboratories proper. Each one of them is to be supplied with three sorts of water supply,—the city water (which in this case is very hard), rain water which will be drawn from a cistern constructed on the property near the building, and sea water from an enclosed salt water system, entirely within the building. Each of the greenhouse extensions communicating with a laboratory is similarly supplied, but with less permanent installations for holding the water, so that it may be possible to modify the conditions when demanded by any new experiment. The laboratories and greenhouses have also a supply of cold

brine for refrigeration, taken from a plant in the basement. Direct and alternating electric currents are available in every room, but illuminating gas is kept out of the main laboratories because in previous experimental buildings, it has been found particularly fatal to the continued normal support of animal life. The number of connections planned for each laboratory is ample to allow of the installation of various electric and water appliances useful in conducting experiments of any kind on the animals under control.

The basement of the building is utilized for the necessary machinery involved in the various installations. This includes, in the first place pumping machinery to run the salt water system, and a second system to drive the city water or the rain water systems. The basement also contains a refrigerating machine and some other incidental machinery such as the compressor and regulator for the air machine from which the compressed air is distributed to each of the laboratories under the proper pressure condition. The cases and tables in greenhouses and laboratories need no special comment. They are of the usual laboratory type. The greenhouse wings are of standard construction, but on the greenhouse benches are placed either movable or fixed aquaria. Most of these can be readily modified at will in position and size, but one set of salt water aquaria and another of fresh water aquaria on the other side are fixed installation. In planning for these the Supervising Architect, Professor J. M. White, has utilized every possible means of securing information concerning plants of recent construction; and visits have been made to various city aquaria and university plants where aquaria have recently been established or have proved effective in operation. On the land around the house, the plan shows a pond laid out. It has the general shape of a dumb-bell, with a very long, narrow neck. Each one of the enlargements at the end of the connecting neck has an area that is precisely one-tenth of an acre. Dimensions of such diminutive proportions provoke a smile from the fish culturist. It is in his opinion nothing but a "mud hole,"—and yet let me assure

you, *without the mud.* A weir and gate which can be tightly closed is located at the central point in the neck of the dumb-bell; consequently, the two ponds can be operated together or modified independently, since the water supply is absolutely independent. We can operate one side with rain water and the other with city water. We can modify water conditions of one without affecting in the least those in the other; or if desired, the two may be joined by an open connection such as to insure relative, if not absolute, uniformity in the two parts.

In one of these plants has been incorporated a suggestion that we owe to the kindness of Superintendent Dwight Lydell, of Michigan. In one of the two ponds has been constructed a series of small islands. The area and location of these have been planned so exactly that the shoreline of the east pond is just twice as great as the shoreline of the west pond, but the water area and the water volume are substantially identical. A small bridge thrown over the neck that joins the two ponds gives entrance to the experimental laboratory building. The whole tract of land, including buildings and ponds, is to be surrounded by a cat and boy proof fence, far enough from the outer edge that no combination of bamboo pole and bent pin can possibly prove successful in robbing the experimental ponds of their treasures.

Each pond has a kettle with a maximum depth of 12 to 13 feet. The outlet from the kettle is surrounded by a box from which a plank bridge extends to the shoreline. An inlet is located in the communicating neck, and one inflow point is located on each side of the gate separating the two ponds. In this installation attention has been paid to the fact that in this region it is not possible to use water, lavishly. It is in one sense the dryest point in the state of Illinois, for it lies on the height of land between Chicago and the Gulf. Several of the rivers of this region originate as tiny streams, within a few miles, or less, of the very point where this plant is located. There are now in the county no lakes and very few permanent streams of any size. Extensive drainage ditches have eliminated surface moisture, but even before their con-

struction the territory was without any permanent water bodies. It is important to consider the bearing of this upon the experiment under consideration. A fish pond is being built where, within the knowledge of man, no pond has ever existed before. A unit for existence of water life is being constructed in a county where such units have not existed under natural conditions. In a region where temporary pools of water have heretofore furnished only possibilities for aquatic existence, we are constructing a permanent aquatic unit, and planning to test in it the conditions of existence for various organisms, especially the fish.

Because of the fact that no large supply of flowing water is available, and what we use will come from tanks, cisterns, or wells, we are compelled to use it continuously; and a plant will be installed to circulate the water. The general plan in mind is to take the water from the outlet box by means of a small pumping apparatus, and turn it back again through the inlet. This inlet pipe will be raised above the surface of the water, so that the water inflow will be aerated in coming out and falling into the pond, again. Starting absolutely from the beginning, it will be possible to keep a record of the time at which each addition is made to the pond, and of all the material, either plant or animal, of perceptible size that goes into it. Of course, it will be impossible to control the wind and dust, and all of you are aware that the microscopic life of the water is probably carried in the form of spores or resting stages in the dust. No doubt many things will be brought into this pond that will surprise the recorder, and it is possible that in this way some information may be gained regarding the stocking and restocking of water bodies with the minute plant and animal life. It will also be impracticable to control the insect life, but apart from these, we shall be able to determine the origin of any element and to know that all increase or decrease is dependent on conditions which we fix. In other words, in a new and definitely circumscribed environment the conditions will be under control so far as possible, and all of

those under control will be definitely measured and recorded.

Evidently the possibilities of experimentation are present here as they could not be in a larger plant. They are also to be attacked in a very different fashion. In one sense, they are not at all the problems that concern the practical fish culturist, who receives from state or national authorities a definite sum of money and is expected to show the hatching and planting of a commensurate number of young fish. The primary object of this plan will be experimentation and that will be carried out on a purely biological basis. Studies will be made on all the various types of organisms with a view to determining the most favorable conditions of existence. That means as regards the fish the effort will be made to ascertain what factors modify the number of fish, the rate of growth, the rapidity and perfection with which they reach the adult condition, how different kinds of food affect them, how differences in the environment of temperature, chemical constitution, and vegetation, as well as other living things which are in the water, but do not constitute a part of the food, will influence their welfare. In this field, we are very fortunate at the University of Illinois in having as a member of the staff Dr. V. E. Shelford, whose valuable contributions to the study of the fundamental conditions of aquatic existence are very well known. It is hoped that taking advantage of these important researches, it may be possible to determine their relations in a practical way to the problems of the fish culturist.

The general arrangement of the plant favors the easy transfer of the fish at any time from the pond to the aquaria within the greenhouse or the laboratory of the vivarium, where they can be kept under a much more limited environment and examined more closely and constantly, as well as subjected to artificial influences and the experimental environment of the laboratory. The small size of the plant and the ease with which one of the little ponds can be run off makes it possible to alter the environment rather quickly, by changing the water,

adding some chemical, or cleaning out some type of vegetation. In every way, it seems to furnish possibilities of culture such as have not been given or utilized anywhere else, so far as I know.

Now, this has a very definite and practical bearing, and I was much interested to see the way in which the Board of Trustees of the University of Illinois treated the original discussion when the idea of such a plant was presented to them. One of the distinguished members of the Board is a gentleman whose repute as a fisherman and angler is very high. He is said to be able to tell more stories than any other man in the state of Illinois, on the subject of catching fish. He immediately seized this pond as one of the things that would interest the state, and became still more interested when I told him that this pond of water was just what any farmer could have in his front yard, precisely the same as he plants a garden there, and if we could work out principles which would show the man on the farm who wants a little lake where lakes do not exist—I am not talking about Wisconsin, Minnesota, Michigan or Northern New York; I am talking about a place where natural bodies of water do not exist, —if we could tell the farmer how to establish a little lake in his front yard, that would keep itself fresh and sweet, and that would produce for him some fish out of which he could derive pleasure and obtain perhaps some profit, we would be doing him a real service. The support which the mere outline of the report received from the Board of Trustees, and from a conference of the State Agricultural Society, which was in session at the University, showed that if the plan could be worked out, there was no question about the support of the state for more extensive experimentation.

The objects of the plan, then,—as stated briefly, and this lays before you the main points in the scheme,—are (1) to establish a plant so simple that it can be duplicated in every respect by any man, anywhere, (2) to work out the proper environment for most efficient fish production so that the individual anywhere may let the pond produce the fish itself, (3) to eliminate the work that a man

in such a situation would not be able to perform, and then (4) to combine with these, of course, the determination of the fundamental conditions of existence that are favorable and unfavorable for fish life. Naturally this study concerns not merely the fish, but the smaller animals, such as insects, etc., that constitute the food for the fish, and also still other forms, like the microscopic organisms which are so abundant in the complex of life, and so important.

PROCEEDINGS OF THE FORTY-FOURTH ANNUAL MEETING

The Forty-third Annual Meeting was held in the New National Museum at Washington, D. C., on Wednesday, Thursday, Friday and Saturday, September 30 to October 3, 1914.

Wednesday, September 30, 1914.

The meeting was called to order at 10:30 A. M., by the President of the Society, Professor Henry B. Ward of Illinois University, Urbana, Ill. Hon. Wm. C. Redfield, Secretary of the Department of Commerce, was then introduced. After welcoming the members of the Society to Washington and presenting some interesting reminiscenses, Secretary Redfield proceeded to discuss some of the needs of the United States Bureau of Fisheries as follows:

ADDRESS OF SECRETARY REDFIELD.

"In the first place, our methods provide no easy way of bringing before Congress and the public the needs of the service. In this respect I think our government is one of the most backward. I cannot go myself before Congress to present these needs. If I were a cabinet minister in England, France, Germany or Austria, I could. In every country where they have a responsible ministry, access is direct between the legislative authorities and the executive department. I may write a letter to the President asking him to transmit in his message to Congress something that I wish to bring before that body and the country, but the President's message is necessarily limited in scope, confined to important matters and must be brief. I might go before a congressional committee, particularly the Committee on Appropriations, but their work is done under pressure, in very limited time, without any opportunity for personal touch

away from the committee table, and there is no time to place before them long communications. The House Committee on Fisheries and the Senate Committee do all in their power, but the House Committee is also the Committee on Merchant Marine, which is a very exacting subject, so that the question of fisheries gets the small end of it. It remains to take up the subject with the individual chairmen, but they cannot give their whole thought, nor even connected thought, for a long time; or to take it up with individual congressmen or senators and interest them in the matter, but they also have other things to do. If our cabinet ministers had the privilege of a place upon the floor, without a vote, and could present their views and answer questions, we should overcome, at a singe stroke, much of the difficulty that stands in the way. If I could go before Congress on behalf of the Bureau of Fisheries, and say that such things should or should not be done for such and such reasons, the knot which ties our hands would be cut, but oftentimes the effort to get the facts before the people who have to deal with them is a very real difficulty.

"Now, coming to other matters of practical effect, the Bureau of Fisheries has not the apparatus to do the work which it ought to have. Any private concern equipped as is the Bureau of Fisheries, would go out of business in a very short time. Through the kindness of an all-seeing Providence the building in which the Bureau is housed continues to stand! It is a makeshift; a second-hand outfit; not complete for the purpose; not suited for the purpose; and that it gets along so well is largely due to the splendid spirit of the men who operate it. They work under a serious handicap.

"We ought to have an aquarium. We have only the beginnings of one. Some day we may get an aquarium commensurate with the dignity, power and usefulness to the United States of this great service and thus afford the opportunity for study which such an aquarium would make possible.

"Do you realize that we do not get money enough to

buy new apparatus, but have to buy second-hand and use it as long as it will last? Do you realize that no private business would think for an hour of running on such a basis as some of our services are compelled to run upon? One of our vessels is a second-hand yacht. It was a very good one, when it was built, for inland waters, when it did not blow. But that vessel is supposed to navigate the rough waters of the North Atlantic in Winter time. We have tried for three years to have that vessel replaced, but cannot get the money. We have another second-hand craft, one of the most agreeable pleasure boats of her kind, but unfortunately, she, too, has to go to sea. Why cannot we have once in a while the privilege of a new ship? We would be content if we had the price of one tenth of a battleship for the entire fleet!

"Come with me for a moment to the coast of Alaska. There is not much of it,—only about twenty-six thousand miles, a little more than Gulf, Atlantic and Pacific coasts put together. For many thousands of miles of this coast which we are supposed to inspect and for the inspections of eighty-seven canals and a number of streams required by law to be closed and which we were supposed to keep closed, we had four men and no vessels. Now there is a beautiful situation for a great and practical people! We did not know, we could not know, and for years have not known whether the regulations were violated there or not, for we had no means of finding out. If you were running a fish cannery there, this was the method of inspection; you would get a letter from the inspector, saying that he was going to inspect your cannery and would you please send your boat and get him; and that has been the only way in which access has been possible to those places which we wished to inspect.

"Now I have put before you certain very plain pictures. That is the kind of extravagance we have had in the Bureau of Fisheries! Now we protest that this situation is wholly wrong. Scientific men, men of energy and enthusiasm, cannot be expected to work with inefficient tools. It is wasteful to the highest degree. Wise expenditure is the truest economy. There is no busi-

ness man who does not know that to stint productive investment is to lose money. I do not believe for an instant that the American people care whether this government spends a million or two more or less, by itself considered, but I do think they care mightily whether that money is productively spent so as to bring them what they have a right to expect in economic and efficient service. Productiveness arising from spending is the sole basis of economy, and to send men to sea in unseaworthy ships, to equip a great bureau with a building which is hopelessly out of date and to require it to do that which it is ridiculously without the means of doing, may be miserly, but it is not economy."

Secretary Redfield further deplored the fact that all attempts to secure an appropriation for the services of a pathologist in the Bureau of Fisheries have been unavailing, and continued; "I wish that copies of the papers on the diseases of fishes presented here could be sent to each member of the Appropriations Committee of the House of Representatives with a personal letter from a lot of you, indicating the seriousness of this matter and that this means the adoption of measures of the same ordinary common sense in treating this important article of food, that have been already adopted with reference to the examination of beef, or to looking after the health of animals affected by tuberculosis and affecting the milk supply. The adoption of such measures is a matter of common sense.

"If an attitude of sympathetic consideration for the great work in which you have a part, which we have at heart and which it is our duty to perform, can be created, much will be gained. I hope that out of this meeting there may come something that will awaken a practical sympathy on the part of men who are anxious and willing to do what is right, but who do not know as well as you what the circumstances require."

At the completion of Secretary Redfield's address the regular business of the Society was resumed.

President Ward announced the Committee on Program for the meeting, to consist of Dr. Geo. W. Field, chair-

man, and Messrs. Dwight Lydell of Michigan and Jesse Mercer of Georgia.

REGISTERED ATTENDANCE.

The following members were in attendance at the meeting, sixty-two in number:*

Adams, Wm. C.
Alexander, M. Leigh
Beal, F. J.
Bean, Barton A.
Benson, Jno. T.
Blackford, Chas. M.
Bower, Seymour
Bowers, Geo. M.
Brown, Ernest C.
Casselman, E. S.
Clark, E. D.
Cobb, Eben W.
Cogswell, L. M.
Crampton, Jno. M.
Crandall, A. J.
Detwiller, Jno. Y.
Downing, S. W.
Dunlap, I. H.
Dyche, L. L.
Embody, Geo. C.
Fearing, Daniel B.
Fearing, Mrs. Doniel B.
Field, G. W.
Filkins, B. G.
Finley, Wm. L.
Geserich, L. A.
Graham, Geo. H.
Harron, L. J.
Hay, W. P.
Hayford, Chas. O.
Hoxsie, F. D.
Hubbard, Waldo F.
Johnson, Robert S.
Keil, W. M.
Kendall, W. C.
Kraiker, Carl
Lee, W. McDonald
Lydell, Dwight
Lydell, Mrs. Dwight
Marsh, M. C.
Mercer, J. E.
Moore, Jno. D.
Morton, Wm. P.
Neal, Walter I.
Nichols, John T.
Osburn, Raymond C.
Palmer, T. S.
Porter, R.
Radcliffe, Lewis
Smith, H. M.
Speaks, Jno. C.
Stapleton, M. F.
Struven, Chas. M.
Thayer, W. W.
Titcomb, John W.
Vandegrift, S. H.
Wallace, Jno. Henry, Jr.
Ward, Henry B.
Ward, J. Quincy
Welsh, W. W.
Willard, C. W.
Woods, John P.

NEW MEMBERS.*

The following applicants, forty-one in number, were elected to membership in the Society:

Alaska Packers' Assn, Patron
Anderson, T. T.
Annin, Howard
Beal, F. J.
Bolton, C. C.
Bordenkecher, R. R.
Briggs, A. B.
Brown, Ernest C.
Brown, Ernest Clive
Coffman, J. N.
Crampton, John M.
Conger, Geo. C.
Davidson, J. O.
Dimick, F. F.

*For addresses see membership list.

Forsyth, Robert
Gammeter, John R.
Garcelon, Wm. F.
Greene, John V.
Harris, Fred N.
Kavanaugh, W. P.
Kraiker, Carl
McDonald, E. B.
May, Jacob
Mercer, Jesse E.
Moore, John D.
Myers, I. S.
Nightingale, H. W.
Osborn, A. L.
Russell, Geo. S.
Smith, W. A.
Stone, Dr. Willard J.
Struven, Chas. M.
Stryker, Thos. H.
Tillman, Robt T.
Torrey, Prof. Harry Beal
Vogel, J. C.
Vandergrift,, H. D., Life Member
Wallace, John H., Jr.
Washburn, Prof. F. L.
Wolters, W. B.
Work, Gerald

President Ward then called for the reports of the Recording Secretary and the Treasurer, which were given as follows:

REPORT OF THE RECORDING SECRETARY.

To the officers and Members of the American Fisheries Society:

The most important as well as the heaviest work that has fallen to the office of the Recording Secretary has been that of editing and publishing the annual Transactions for the year 1913, the Boston meeting. As the Secretary was not present at that meeting and as he had had no previous experience in this Society's work the labor was necessarily somewhat greater that it otherwise would have been. However, the volume was distributed by July 15. The contract was let to Clark & Fritts of New York City, as the lowest of a number of bidders, and 800 copies were ordered printed.

By a resolution adopted at the Boston meeting, free rein was given to the Secretary and Publication Committee in the matter of editing. The general opinion expressed at that meeting was that the discussions should be cut down in printing to mere essentials. Following this plan, the records of the business meetings, etc., were made to cover only 38 pages, which is the lowest record for this century at least. I believe that an inspection will show that nothing essential has been omitted.

The directory of members was printed in small type, thus saving another ten pages.

These cuts have permitted the publication of more scientific matter without increasing the size or cost of the volume. Thus the 1913 volume, while actually 12 pages smaller than that of 1912, contains 10 pages more of scientific matter.

The Secretary takes this opportunity to thank the members of the Publication Committee for their support during the progress of the work. It was not found necessary to reject entirely any paper presented for publication, but some of them were cut down or otherwise amended, the author's consent being gained in each case.

The sale of back numbers of the Transaction was referred at the Boston meeting to the Secretary and Treasurer in conjunction with the Executive Committee. Upon canvassing the situation it was discovered that the total average cost of producing and mailing the Transaction for a number of years back, has been about $1.50 per copy. (This amount of course covers stenographic and other work in connection with the proceedings.) The cost of the 1910 number on this basis was about $2.00.

The secretary wishes to call the attention of the newer members especially to the fact that there is an abundant supply on hand of the volumes from 1904 to the present, and to suggest to them that here is a good opportunity to add to their libraries much valuable literature on fishery matters, and at the same time to add to the Society's funds.

During the year reports have been sold to the amount of $51.50.

Back volumes of Transactions in the hands of the Secretary are as follows:

1876—1	1900— 3	1907— 85
1884—1	1901— 1	1908—117
1895—2	1902— 4	1909—135
1896—1	1903— 0	1910—113
1897—3	1904—61	1911—127
1898—4	1905— 1	1912—229
1899—1	1906—92	1913—230

It will be seen from this table that there are only two scattering copies in the Secretary's file back of 1895 and that there is no copy of the 1903 number. There should be in the hands of the Secretary a complete file of the Transactions, to be kept intact as the property of the Society. The Secretary would offer the suggestion that if any of the older members of the Society have such back volumes which they no longer require, it would be an excellent thing to donate these to the Society.

The Secretary, in carrying on the work of his office has expended the following amounts:

Postage	$72.13
($46 of this for mailing Trans.)	
Expressage	20.55
(mostly for material in hands of the former Secretary)	
Typewriting	12.28
(copying scientific papers)	
Sundries	4.45
Total	$109.41

The Secretary has kept in mind the financial difficulties under which the Society has been laboring and has endeavored to keep his expenditures as low as possible, often at the expense of much personal labor and time. When the Treasurer is no longer embarrassed by a deficit, much of this can be hired done, thus making the duties of the Secretary less onerous. The occasional assistance of a stenographer in conducting the correspondence would especially lighten the work, but until the finances are in better condition even this has been dispensed with.

The deaths, within the year, of the following members has been reported:

Honorary member.

Dr. P. P. C. Hoek, Scientific Fishery Adviser of the Dutch Government, 1906.

Active members.

1872, Prof. A. S. Bickmore, American Museum of Natural History, New York City.

1901, T. J. Blakeslee, New York City.

1913, Austin Cook, Woonsocket, R. I.

1910, Thos. M. Darrah, Wheeling, W. Va.

1875, Dr. Theodore N. Gill, Washington, D. C., an authority on the morphology, classification and natural history of fishes.

1900, J. J. Hogan, Madison, Wis., life member and member of the Wisconsin Board of Fish Commissioners.

1903, Mr. E. C. Lambert, Manchester, N. H.

1899, Mr. Chas. H. Moore, Detroit, Mich.

1910, Mr. Overton W. Price, Washington, D. C., member of the National Conservation Association and a member of the Committee on Foreign Relations of this Society.

1899, Mr. Henry T. Root, Providence, R. I., formerly President of this Society during the year 1904-5.

The membership has been increased since the 1913 meeting by 33 members up to the beginning of this meeting. The active membership is now over 600 though it is probable a number of these will have to be dropped in the near future for non-payment of dues. It is useless for us to carry dead wood on our membership list and we must not deceive ourselves by the size of our list, even though it is certain that our Society now has more members in good standing than ever before. Every member of this Society should organize himself into a committee of one to push the work of the Society, to make it known to his friends and especially to increase the membership. When it is seen that New York and Massachusetts have more than 60 members each, so that the two of them have one-fifth of all the active membership of the Society, some one must have been at work, and when the little city of Akron, Ohio, with no unusual fishery interests, has nine members of the 29 listed for

Ohio, some one there must have displayed great activity in spreading the gospel of fisheries work.

It was moved and carried that this report be accepted.

REPORT OF THE TREASURER.

To the American Fisheries Society:

I herewith submit my Annual Report as Treasurer from September 8, 1913 to September 30, 1914.

RECEIPTS.

1913-14			
	Balance in Treasury	$ 241.54	
	Sale of Reports	17.50	
	Donations	41.00	
	Life Membership fee	25.00	
	Yearly dues	847.00	
			$1,172.04

EXPENDITURES.

1913			
Sept.	11	Sundry expenses, Boston meeting	$ 2.70
"	25	C. J. Butler, envelopes	21.36
Oct.	28	Jeanette Soule, stenography	180.00
Dec.	5	J. J. Colley, packing books, etc.	10.00
"	5	R. C. Osburn, Sec'y, express etc.	16.21
"	5	W. E. Roberts Co., publishing 1912 Transactions	600.87
"	8	Irving Press, printing	25.10
"	17	J. H. Murphy	1.00
1914			
Feb.	23	R. C. Osburn, Sec'y, postage, etc,	23.33
May	19	F. A. Ringler Co., engraving	2.70
June	27	Henry B. Ward, telegram	1.00
July	18	Clark & Fritts, publishing 1913 Transactions	400.93

July	25	H. D. Allen, postage, etc.	8.08
Aug.	8	C. J. Butler, P. M., envelopes	10.68
Sept.	17	J. C. Hall Co., receipts	6.75
"	19	H. B. Ward, telegrams, etc.	2.10
"	19	R. C. Osburn, Sec'y, postage on Transactions	68.07
"	19	R. C. Osburn, Sec'y, salary for year	50.00
			$1,429.88
Sept.	30	Balance due Treasurer	257.84
			$1,429.88

Respectfully submitted,

C. W. WILLARD, *Treasurer.*

Westerly, R. I., Sept. 30. 1914.

To the American Fisheries Society:

I herewith submit the Annual Report of the Permanet Fund of the Society.

Received from Alaska Packers' Ass'n Patron fee $50.00. This amount is deposited with the Industrial Trust Company as Permanent Fund of the American Fisheries Society, and is drawing interest at the rate of four per cent.

Respectfully submitted,

C. W. WILLARD, *Treasurer.*

Westerly, R. I., Sept. 30, 1914.

Moved and carried that this report be referred to the Auditing Committee.

The Treasurer was asked to comment on the financial condition of the Society and pointed out that "while there is a balance of $257.84 due the treasury, the Society would not have been in arrears if it had not been for the fact that it was necessary to pay for the 1912 Transactions as well as for the 1913 number, thus adding more than $600.00 to the amount. The coming year we

will not have to pay two years' bills, so that by the next meeting we may again have a balance on the right side of the ledger."

The Recording Secretary explained further that the difference in the cost of the Transactions for the two years was not quite as great as it appeared in the report, since the cost of mailing, nearly $50.00, was made a separate item in handling the 1913 Transactions. Nevertheless, there was a very considerable decrease in the cost of publication. He stated, further, that if the increase in the number of life members had been as great as in the preceding year, the Society would be entirely out of debt.

PRESIDENT: I think it is proper for the Chair to express the appreciation of the Society for the work of these two officers. Most of you know that a few years ago, by a complication of circumstances we fell into financial difficulties. The Society is evidently well out of this now, however, and it has never been more active, more thoroughly and vitally interested, as may be seen from the number of papers presented by the members for this meeting.

Most of you know that a Pacific Fisheries Society has been organized on the Pacific Coast and that a very successful meeting was held in August. At that time I received the following telegram addressed to the American Fisheries Society in my care:

"The Pacific Fisheries Society, in its first annual session, sends greetings to its sister society.

(Signed) JOHN N. COBB, *Secretary.*"

Knowing that you would wish it done, I took the liberty, without waiting for formal action, of sending a reply in the name of the Society:

"The American Fisheries Society extends greetings and congratulations to its new sister organization on the splendid outlook for its future.

(Signed) HENRY B. WARD, *President.*"

It is also proper that I should call attention to the work done by the Local Committee in arranging at a

rather late date such a splendid program for this meeting. The program speaks for itself and I do not need to comment on the indebtedness we feel to each member of that committee, and particularly to its chairman, Dr. Hugh M. Smith.

We have received a considerable number of invitations for the meeting of next year from various cities, Springfield, Mass., Detroit, Mich., Buffalo, N. Y., San Francisco-Calif., Oakland, Calif., St. Louis, Mo., Atlantic City, N. J., and Chicago, Ill.

MR. M. L. ALEXANDER, of New Orleans: Mr. President, if I may be permitted at the proper time, I wish to present an invitation to this Society to meet in New Orleans.

PRESIDENT: This is the proper time and the invitation will be considered by the Committee on Time and Place of Meeting when that committee meets.

DR. HUGH M. SMITH, Commissioner of Fisheries: If I am in order, Mr. President, I would like to give notice of the death of Dr. Theodore N. Gill, which occured in this city on the twenty-fifth of September, 1914. Dr. Gill has been an active member of this Society since 1875, and, as you all know, took great interest in our work and was one of the foremost authorities on fishes in the world. I will not say anything more at this time, but I hope that a suitable memorial may be prepared for publication in the Proceedings of the Society.

PRESIDENT: May I suggest that in recognition of the great services of Dr. Gill in the work for which this Society stands and to science in general, we should now, by a rising vote, make a matter of record of the notice and of the regrets which are felt by this organization. (All the members present arose.) This will be entered on our minutes and the matter referred to the Committee on Resolutions for more formal action.

We have at hand the report of one of the standing committees of the Society, that of the Publicity Committee, by Mr. H. Wheeler Perce, Chairman, of Chicago. In the absence of Mr. Perce I will ask the Secretary to read the report.

The report, in the form of a letter to the President was read:

PRESIDENT: While it may not be wise to publish this report, since it is purely tentative, there are in it some suggestions so good for the Society and for the organization of its activities that I should like to see it referred to some committee, say the Executive Committee, for consideration. If it seems wise they can report on certain of these recommendations at a subsequent session.

MR. JOHN P. WOODS, of Missouri: I move, Mr. President, that this report be accepted and referred to the Executive Committee.

The motion was put and carried.

PRESIDENT: Before we adjourn I wish to announce the Committee on Time and Place of Meeting. The Chair will name Messrs. Fearing of Rhode Island, Woods of Missouri, and Downing of Ohio.

The session was then adjourned.

Wednesday, September 30, *Afternoon Session.*

Prof. L. L. Dyche, State Game and Fish Warden of Kansas read a paper entitled "Notes on the New Kansas Fish Hatchery and the First Year's Output." For this paper and the discussion which followed, see Trans. Am. Fish. Soc., Vol. XLIV, No. 1, pp. 5 to 12, Dec. 1914.

The reading of papers terminated at this point and the session adjourned to meet in the large lecture hall, where the Bureau of Fisheries exhibited a series of moving pictures on "The Salmon Industry of the Pacific Coast," illustrating the methods of taking and canning Salmon.

Thursday, October 1, *Morning Session.*

The entire morning was taken up by the reading and discussing of three papers in the following order:

Mr. M. L. Alexander, New Orleans, La., "Notes on the Habits and Commercial Importance of the Paddlefish." See Transactions, Vol. XLIV, No. 1, pp. 73-78, Dec., 1914.

Dr. Wm. C. Kendall, Washington, D. C., "Taxonomic and Fish Cultural notes on the Chars or Trouts of New

England." See Transactions, Vol XLIV, No. 2, pp. 97-108, March, 1915.

Mr. M. C. Marsh, Buffalo, N. Y., "The Feeding of Trout in Relation to Thyroid Tumor." See Transactions, Vol. XLIV, No. 1, pp. 13-19, Dec., 1914.

The session adjourned at twelve o'clock.

Thursday, October 1, *Afternoon Session.*

PRESIDENT: According to the constitution and the custom of the Society the President is required to name the members of the Publicity and Editorial Committees. I therefore beg to submit the following:

Committee on Publicity:

Mr. H. Wheeler Perce, Mr. Geo. H. Grahm, Dr. T. S. Palmer and Mr. G. E. Jennings.

Committee on Publication:

Dr. Tarleton H. Bean, Prof. Bashford Dean and Mr. John T. Nichols.

The following papers were then read and discussed:

Mr. Lewis Radcliffe: "Progress in the Culture of the Diamond-Back Terrapin, with exhibition of specimens." See Transactions, Vol. XLIV, No. 1, pp. 33-36, Dec., 1914.

Mr. Lewis Radcliffe: "Notes on some North Carolina Sharks and Rays, with exhibition of specimens." See Transactions, Vol. XLIV, No. 1, pp. 37-40, Dec., 1914.

Mr. Wm. W. Welsh: "Demonstration of Some Modern Oceanographic Apparatus as Used by the Bureau of Fisheries." The speaker commented on the use and special value of the instruments shown.

Mr. John W. Titcomb: "The Use of Copper Sulphate in Destroying Obnoxious Fishes." See Transactions, Vol. XLIV, No. 1, pp. 20-26, Dec. 1914.

President Ward then introduced Hon. J. Charles Linthicum, Member of Congress from Maryland, author of a bill to place migratory fish under Federal control, who addressed the Society on the topic, "Why the States have been Unable to Protect our Food Fish."

ADDRESS OF THE HON. J. CHAS. LINTHICUM.

"When one reflects upon the numerous difficulties the separate commonwealths have experienced in securing and enforcing protective measures, when he realizes that for over a hundred years these individual states have been struggling with this problem, during which time—in the majority of instances—they have failed to secure satisfactory regulations, he will be convinced that the National Government alone is the only power that can effectively cope with the situation.

"The causes of the failure upon the part of the states to protect their food fish may be divided into three classes:

1. Insufficient laws.
2. Inefficient administration of these laws,
3. Conditions beyond the jurisdiction of the state to control.

Insufficient Laws.

In many states I find that the administration of laws for the protection of food fish is entrusted to the head of a Fish and Game Department. Too often the general inclination of such officials is to treat the subject as a sporting proposition and to give it more attention from that standpoint than from the point of view of the commercial fisherman. While the sporting end of the proposition concededly merits attention, in a majority of cases the real interests of the people are centered in its commercial aspects. The commercial fisheries thus neglected by the official who should be primarily interested and whose duty it is to initiate legislation for their protection and development, wane and languish and eventually cease to be an important economic asset.

But even where state officials realize the importance of protecting the commercial fisheries (and this protection involves legislation curtailing some rights at present enjoyed) such legislation is sure to meet with formidable opposition. When such fights come before the legislature the fishermen are usually in possession of the sympathy and votes of those members from their particular section.

We are apt then to witness the employment of log-rolling and filibustering tactics to defeat legislation for the general good. Under such conditions the equitable solution of the problem rests with those members whose constituents are not directly affected by the proposed legislation. For example, it is said that members from the interior counties of Virginia have given that state the best fish and oyster laws the Old Dominion ever enjoyed.

The disposition upon the part of state officials to deal leniently, even gently, with violators of state laws, is too well known to require comment from me. And where a specific individual is the wrong-doer and the great imperceptible body of the people are the sufferers the inclination to leniency on the part of such officers is apt to be unduly magnified.

When a reformative measure is contemplated by one state, which entails the co-operation of another, we have found it next to impossible to secure its passage, for the reason that there is no officer who can pledge his state to do its share toward the correction of the situation requiring joint remedy. And when one state proceeds to enact a measure, the success of which depends upon the joint action of other states, and the other states fail in their part, the state which has taken the lead invariably feels that it has been aggrieved and imposed upon and future efforts for reform inevitably suffer a set-back.

It required more than one hundred years of dickering upon the part of Maryland and Virginia to concur in measures for the protection of the oyster beds in the Potomac river before satisfactory legislation was finally agreed upon.

We should bear in mind that the natural resources of the state are equivalent to so many dollars in the bank placed there by an all-wise Providence. Every state ought to know the extent and value of these resources within its dominions. It ought to inventory them as correctly as possible, check off withdrawals, keep tab on their increase or decrease and conserve and protect them in the same systematic and methodical manner in which it accounts for and protects its other treasures.

But this is not done. I find that many of our coast states do not require licenses to operate line, gill, or pound nets, and for that reason their officials are unable to tell how many of these nets are in operation in their waters. Others do not require from the licensed fishermen reports of their catches, in consequence of which they are unable to tell whether or not the fish in their waters are increasing or diminishing. For illustration, an official at the head of the Fisheries of the State of Rhode Island confessed that "the absence of a law making fishery returns compulsory prevents the securing of accurate data in fisheries." Now the squeteague, one of the four principal fishes of that state, has decreased considerably; yet no accurate data are obtainable by which to determine the percentage of decrease, or the causes which have produced the same.

In Connecticut the catch of shad has decreased in the past ten years over 70%, that of bass, over 86%, and that of the pickerel over 54%. The Superintendent of the State Board of Fisheries attributes this decrease to the pollution of water and streams running dry.

The Chief Game and Fish Warden of Delaware writes:

"I regret that no statistics are available. We are just beginning to work on fish protection in Delaware. Our warden service is less than a year old and from lack of funds has been able to do nothing but preparatory work with our food fish industry."

And yet the four principal fish of Delaware are the trout, shad, menhaden and sturgeon—a most valuable series. It will be remembered that the catch of the last named fish brought over one million dollars annually to the fishermen of Delaware until unregulated fishing destroyed the fisheries.

It will be noted from the excerpts quoted that the insufficiency of laws is blameable for the losses enumerated.

Rhode Island fails to require its fishermen to make returns of their catches, in consequence of which that state is sustaining an undetermined loss.

Connecticut suffers from a river pollution which she

has not stopped; Delaware is crippled by a lack of funds to do anything but preparatory work. I might recite other similar cases, but those mentioned are sufficient to make clear the necessity of legislation which will, without fear or favor, apply the remedy needed in any specific case.

Inefficient Administration.

Many states suffer the lack of capable officers in charge of their fisheries. Regardless of how conscientious and well-intentioned an official may be, if he possess not the knowledge and ability to fully discharge the duties of his office, the state is bound to be injured. More than one state has found that a well-paid, competent officer in charge of its fisheries is the most excellent investment a commonwealth can make. With good laws and capable, determined men to enforce those laws, the profits in the fisheries will prove a source of never-ending congratulation. Experience has shown that it is as difficult for the states to get good men as it has been for good men to get in the service of the states.

But the mere getting of good men is not the solution of the problem. These men must be made independent of influences which would paralyze their activities for good. They must be placed beyond the reach of those who, resenting the fearless discharge of their duty, would seek to wreak an unworthy venegance. Happily, many of our states have already done this, and it will be found that in those states wherein the men having charge of the fisheries are protected in the discharge of their duty, there is a better, more just and more equitable enforcement of the law and improvement of conditions, than in those states where these precautions have been neglected.

Indeed, I have found opposition to federal regulation of our fishes arising under conditions that cause me to suspect that it is mainly inspired by the fear that national officials will enforce the law in a way that would not be attempted by state officials. I likewise find that, for the very same reason, many commercial fishermen would

like to see our Government take charge of our fisheries, believing that with Federal control there would be an enforcement which would do equal justice to all.

Under present conditions, a noteworthy situation arises. States bordering the same body of water are intimately concerned in the passage and enforcement of good laws by each other. If one state fails to enforce its laws and, by reason of this failure, its fishermen take from this joint water more fish than would be their natural share, they not only wrong their own commonwealth, but are perpetrating a wrong against the neighboring state, which, through enforcing the law, prohibits its own fishermen from getting as much as those of the other state. Thus we see a premium placed upon the violation of law, the guilty rewarded and the innocent punished. Now, if the Federal Government controls the situation and the laws are laxly enforced, the hardship does not fall with greater severity upon one state than another, nor would one state reap a disproportionate benefit at the expense of another. Under such a situation, the inefficiency of the states becomes discriminatory, while inefficiency under national supervision would be non-discriminatory.

Conditions Beyond The Jurisdiction of The States to Control.

One of the principal reasons making for national control of our fisheries is the existence of conditions which one state has not the jurisdiction to control. For instance, fishermen in Pennsylvania who get their living from the waters of the Susquehanna are indignant at the lack of regulations restricting Maryland fishermen to seasons and conditions of fish-taking that will allow the fish to ascend the river to where they live. Maryland fishermen want the fisherman of Virginia restricted in order that fair proportion of the fish may get to the waters of the upper Chesapeake. The same complaint is heard in Massachusetts regarding Connecticut, and the Superintendent of Fisheries of New York attributes the decrease "which has occurred in the Hudson and Delaware rivers to the miles of nets along the Jersey shore

preventing the shad and herring from finding their way farther up the river."

Now we all know that notwithstanding the desire which moves the citizens of the several states to fair dealing in their relation with their fellowmen, it is always a difficult matter to convince the legislative body of a state that it should deprive its citizens of what are regarded as certain inalienable rights for the purpose of giving an equitable deal to the citizens of some other state. While the fish are coming his way, the fisherman is content and apt to view almost humorously the complaints of those not so fortunate as himself, but when the situation is reversed, and his own state is powerless to help him—when the sense of justice of another state must be depended upon,—then conditions become almost unbearable. Innumerable waters which flow to the coast pass through the jurisdiction of several states, yet those states nearest the coast have invariably assumed the attitude that they have the right, by reason of their fortunate location, to preempt the wealth which may enter those waters from the sea. To induce them to recede from that conviction would be an effort as hopeless as the tower of Babel.

I am glad that a brighter, more equitable day is dawning. The nation has laid down the doctrine that what is essential to the happiness and well-being of all should be equitably shared by all. It has declared against monopoly and discrimination whether that monopoly and discrimination be in matters of tariff, the possession of coal mines and hydraulic power sites, or what not. Those who have given thought to the subject and supplemented that thought with a thorough study of the situation, become more convinced each day that the equitable enjoyment of our fisheries will never be reached under a system of state supervision. The Federal Government alone possesses the power to handle the situation under regulations that will do impartial justice to all; that will preserve to posterity the fisheries of the nation, a resource whose value is becoming constantly greater by reason of the increasing use of fish in the daily diet of our people."

At the close of Congressman Linthicum's address the Society adjourned to the large auditorium for a moving picture exhibition illustrating "Salmon Culture on the Pacific Coast, as practiced by the U. S. Bureau of Fisheries."

Friday, October 2, Morning Session.

The session opened with an address by Mr. John P. Woods, President of the Missouri State Fish Commission on the topic "What mean these American Fisheries Socity meetings?" Mr. Woods dwelt upon the value of the meetings to the members and upon the necessity of assisting, through the medium of the Transactions, the "large army of laymen throughout the country who desire more knowledge of fishes and fisheries." He suggested that a campaign for a larger membership should be organized. "A decided two-fold benefit would manifest itself, in the strengthened financial condition of the Society which would permit it to publish to a greater extent, and more especially in arousing the entire people to support the many good measures for the protection and propagation of fishes which we now find it difficult to pass and enforce. The sacrifices of science would then be less in vain and the benefits derived would be far-reaching and valuable beyond the power of the mind to grasp."

Mr. Wood's address precipitated a discussion of ways and means of assisting the Bureau of Fisheries to secure proper equipment and appropriations along the lines indicated by Secretary Redfield's address and the furthering of Federal control as suggested by the remarks of Congressman Linthicum.

Mr. Graham of Massachusetts moved that a special committee of five members be appointed to confer with Secretary Redfield and Commissioner of Fisheries H. M. Smith and to report at the business meeting on Saturday morning. Carried.

Later it was moved and carried that President Ward act as Chairman of the committee and be empowered to appoint the other members.

MR. GRAHAM, of Mass.: Secretary Redfield came here and outlined the needs of the Bureau of Fisheries and practically asked us to assist in furthering legislation in aid of the Bureau. Many of the members would like to do something, but if one man in Missouri and another in Massachusetts, etc., each operates along his own line and according to his own ideas, nothing will be accomplished. We must have concerted action, we must have a plan to work on, and that is the only way in which we can get results. I believe that a committee of five men could be selected to work out some plan of operation whereby every man in the Society, and every fish and game commissioner may be able to assist.

MR. CRAMPTON, of Connecticut: I heartily endorse the sentiments expressed by the last speaker. In my State the shad industry has been a very important one, but there has been great pollution of the streams and this year I am sorry to say that the shad fishery has been a total failure. Action must be taken by the Federal Government relative to our fisheries, there is no question about that. The Italians with us have been exceedingly destructive to the fisheries, by catching small fish. I have seen a seine seventeen feet deep and eighty-one rods long, with a pocket having a mesh smaller than a lead pencil. Thousands of barrels of small fish have been taken and sold by measure to be made into soups, etc., and this has been outside of my jurisdiction. The statement made by Congressman Linthicum is correct,—Federal action must be taken and we should hasten to co-operate with the Government in putting a stop to such waste. The weakfish has entirely disappeared from our waters, I have not known of a striped bass being caught this year, and the sturgeon has entirely disappeared from the Connecticut River.

MR. ALEXANDER, of Mississippi: It seems to me that it is eminently proper than this Society should go on record as recognizing the recommendation of Secretary Redfield, and I believe that a committee should be appointed to consider these recommendations and report to the

Society for its endorsement. Mr. President, I move that a committee of five be appointed.

MR. SPEAKS, of Ohio: This is a very important subject, and, considering the interests of Ohio, I think it should be discussed at greater length than time will permit today. I want to say frankly that I am in favor of Federal control to a certain extent, but if the bill now pending in Congress were passed in its present form, it would mean the elimination of at least fifty per cent of our fishing interests in Ohio. I think our Ohio fishermen are perfectly willing to have Federal control of our commercial fisheries, but the coast states are more interested in this subject than we are in Ohio.

MR. GRAHAM: Unless I am mistaken, the motion made by Mr. Alexander has to do only with the recommendations of Secretary Redfield and not the address of Congressman Linthicum, concerning Federal control of migratory fishes. Secretary Redfield's plea was for better equipment, new buildings, more men, etc., something that no state and no fishing industry could object to in the least.

MR. WOODS, of Missouri: It seems to me that we should know more fully what Secretary Redfield has in mind. If we can get from him and Commissioner Smith a good idea of just what is necessary, we should be able to formulate some program, uniform in character, to work on for the support of the Bureau of Fisheries. Many of us are state fish commissioners and we are all representatives to a certain extent of our respective states and we are all anxious to go to our Senators and Representatives in Congress if we can present something of value which will be uniform in character.

MR. ADAMS, of Massachusetts: It seems to me that Mr. Woods has made a very practical suggestion. Let this committee obtain the facts with regard to the needs of the Bureau, if Secretary Redfield and Commissioner Smith are ready to state them, and give them to us in some form which will enable us to help them produce results. Then we can go to our respective Representatives in Congress and provide them with the facts and the

needs of the Bureau. By this means we shall have completed a scheme of education for these men, so that when they return to Congress and fisheries matters are brought up they will thoroughly understand what the plan is. But if it is not presented in proper form and easily accssible we cannot expect a busy Senator or Congressman to give the matter the attention it deserves. He should have at hand the information and the assurance that the plan has the practical backing of this Society and he will know that he is not working in a way that will lay him open to criticism.

The motion made by Mr. Alexander was amended to read:

Resolved: That a committee of five members be appointed to consult with Secretary Redfield and Commissioner Smith in regard to the needs of the Bureau of Fisheries and to report at the business meeting on Saturday morning. Carried.

Moved and seconded that President Ward act as chairman of the committee and be empowered to appoint the other members. Carried.

The Society then passed to the reading and discussion of papers, and President Ward called upon Professor Dyche to open the discussion of the paper presented by Mr. John W. Titcomb at the previous session and which had been postponed. (See Transactions, Vol. XLIV, No. 1, pp. 24-26, Dec., 1914.)

The paper by Prof. Geo. C. Embody was then read and discussed: "Fish Meal and as Food for Trout," (see Transactions, Vol. XLIV, No. 1, pp. 57-60, Dec., 1914).

A motion to adjourn and to meet again at two o'clock was carried, after which a special "marine products" luncheon was partaken of by the members of the Society and their friends at the New Willard Hotel.

Friday, October 2, Afternoon Session.

The President called the meeting to order and then, in the absence of the Vice-president, asked Mr. Seymour Bower, of Michigan, to take charge of the meeting.

MR. BOWER: It was decided at the close of our last session that the first order of business for this afternoon should be the reading of the paper by our honored President, and I have the pleasure of introducing to you Prof. Henry B. Ward, of the University of Illinois.

The paper by President Ward, entitled "An Experimental Plant for the Study of Fish Culture on a Small Scale" was read and discussed. (See TRANSACTIONS, this number, pp. 169-178.)

At 3 o'clock the session was adjourned to give place to a meeting of the National Association of Fish and Game Commissioners, in which many of the members of the American Fisheries Society were especially interested. All members were invited to be present during the address of Senator Geo. P. McLean, of Connecticut, on "The Federal Control of Migratory Birds," and also to witness a series of motion pictures illustrating "Results of Game Protection in Oregon" shown by Mr. Wm. L. Finley, Commissioner of Fish and Game for that State.

Saturday Morning, October 3, Final Session.

The final session came to order for the transaction of such business as remained for the consideration of the Society.

PRESIDENT WARD: Your Chairman has been requested to present a proposed ruling to regulate publication. The object of this ruling is to give the Publication Committee the authority of the Society to act in certain cases, while reserving by the first part of the resolution, the right of the Society to pass upon matters which might involve it in any way.

Resolved: That papers which are controversial and do not add to a knowledge of any question by furnishing new evidence shall not be published except after special action by the Society at a regular meeting. Otherwise the Publication Committee may, if finances permit, accept for publication papers not read at the annual meeting.

Shall this be adopted as a by-law or rule of instruction for the committee?

A motion to put this into effect was duly made and seconded and without discussion, was passed by the Society.

PRESIDENT: The Secretary has a matter to bring up, which is in his hands, and I will ask him to present it to you.

SECRETARY OSBURN: The members who were present at the last meeting at Boston, will remember that the preparation of an index to the first forty volumes of the TRANSACTIONS of the American Fisheries Society was announced by our present Vice-President, Mr. Fearing. This has been completed, final copies prepared and submitted to the Secretary. This is a careful piece of work, covering 136 typewritten pages and involved an immense amount of work. It includes all matters published during the first forty years of the Society's work and is therefore a ready reference to everything issued up to and including 1910. In order that I might have definite information for you with regard to the cost of publication, I submitted sample pages to the printers of our last volume. Their estimate for publishing this index in the same form as our TRANSACTIONS, so that it can readily be bound up with them, is $215.00. I have no doubt that it can be issued at a somewhat lower figure. I believe that this index will be extremely useful in libraries as well as to individuals who desire to look up any articles published in these volumes. It should not be issued in connection with any other volume, but should be separate so that it can be inserted in the series at the end of the forty volumes that it is meant to cover.

PRESIDENT: This matter is before the Society for discussion.

MR. TITCOMB, of Vermont: We are certainly very much indebted to Mr. Fearing for this manuscript and I sincerely hope the Society will take steps to have it published, but we should give our publishing board plenty of time to issue it properly.

DR. T. S. PALMER, of Washington, D. C.: I fully realize what this work means as I happened to be a member of a committee which has published such an index. It should

certainly be published. There is one point which I hope has been considered in its preparation and that is the entry of every author's name in full, and where possible the date of his birth and death, to follow modern bibliographical usage and because libraries need this information. The amount of $200.00 could easily be arranged in some way. The work should not devolve on the regular officers, but let the Secretary select a committee to do the work and simply oversee it.

MR. GRAHAM, of Massachusetts: It seems to me, Mr. President, that it will be quite an undertaking to get some one to do this work. Moreover, it will involve an expenditure of over $200.00 and we ought to know where that is coming from before we spend the money, for the treasury is not in a flourishing condition. I think the condition of the treasury hardly warrants the publication at present.

PRESIDENT: That certainly is a good business suggestion. We have recently been through a campaign in which some of us have been interested in the attempt to clear the Society of debt, and, while we sympathize fully with what Dr. Palmer has said, we cannot but appreciate the financial difficulty. It occurs to me that we do not wish to raise the money here this morning and that it may be impracticable to come to a final conclusion. Our Publication Committee is authorized to do certain things if finances permit. I offer the suggestion that this matter be referred to that committee to secure the publication if possible.

A number of members offered to contribute to a fund for the publication of the index.

The suggestion was also made that a number of the earlier volumes of the Transactions, now impossible to obtain, be re-issued, as it would make the index much more desirable.

PRESIDENT: The question has been discussed pretty thoroughly, but we have no motion before us. Will some one propose a definite solution of the problem?

MR. GRAHAM: It seems to me that this should be referred to the officers of the Society and the Executive

Committee. They will know whether the condition of the treasury will permit the publication. I make that motion.

MR. TITCOMB: I suggest that it be referred rather to the President, Secretary and Treasurer, as such a committee will be less scattered and less unwieldy.

MR. GRAHAM: I accept the amendment.

Motion seconded.

PRESIDENT: The motion has been made to refer this matter to a special committee, consisting of the President, Secretary and Treasurer, with power to act.

The motion was put and carried.

Vice-president Fearing presented a resolution to the effect that the Committee on Publicity be appointed by the President for each meeting a short time before the annual meeting each year. After some discussion this resolution was passed.

President Ward then called for the report of the Auditing Committee.

Report of the Auditing Committee.

To the Members of the American Fisheries Society:

The Auditing Committee has carefully gone over the vouchers of the Treasurer, together with his report, and find the same to be correct.

(Signed) GEORGE H. GRAHAM,
J. QUINCY WARD.

Moved and seconded that the report of the Auditing Committee be accepted and that the thanks of the Society be extended to them for their work. Motion carried.

Report of Special Committee on Needs of the Bureau of Fisheries.

To the Members of the American Fisheries Society:

The Special Committee appointed yesterday begs to report that it has carried out, so far as possible in the time given, the directions of the Society and desires to recommend:

1. That its title be made, Committee on Relations with National and State Governments.

2. That it be authorized to incur the necessary expense involved in carrying on its work.

3. That it be permitted to call upon other members of the Society for aid in matters which seem to require their services.

(Signed) HENRY B. WARD,
M. L. ALEXANDER,
JOHN W. TITCOMB,
WM. C. ADAMS,
WILLIAM L. FINLEY.
Committee.

After some discussion the Society voted to adopt this report and approved the recommendations of the committee.

Report of the Committee on Resolutions.

(Presented by L. L. Dyche, Chairman.)

I. WHEREAS, the passing of Dr. Theodore Nicholas Gill removes from our midst another of that group of scientists remarkable for breadth of view, encyclopædic knowledge and sympathy for research in all forms, therefore, be it

Resolved: That the American Fisheries Society, mindful of the great loss it has sustained, enter on its records the following brief statement of the work of its distinguished member: Theodore Nicholas Gill, born March 21, 1837, in New York City, died September 25, 1914, at Washington, D. C., contributed to humanity as a teacher, first as Adjunct-Professor of Physics and Natural History, 1860-61, then as Lecturer and Professor of Natural History until 1910, when he was made Emeritus Professor of Zoology, in George Washington University. As an Associate of the Smithsonian Institution he won distinction in investigation exemplified in such honors as President of the American Association for the Advancement of Science in 1897, and membership in the National Academy of Sciences and the American Philosophical Society.

He was an authority on the morphology of fishes and mammals, and his numerous writings are conspicuous contributions in the history of the development of knowledge of these groups of animals.

His kindly presence, and his contributions by papers and discussions were conspicuous in the meetings of this Society, of which he was a member since 1875, nearly forty years.

II. WHEREAS, death has also removed, in the person of Henry Theodore Root, one of that body of men who have labored long and diligently in the cause of conservation of natural resources, and especially for the propagation and preservation of fish and game, be it therefore

Resolved: That the following record of the life and work of this valued citizen be entered on our minutes: Henry Theodore Root was born October 5, 1830, and died July 24, 1914, at Providence, Rhode Island. A member of the American Fisheries Society since 1899, he was chosen its thirty-fourth President, for the term of 1904-05, and presided at the meeting held at Atlantic City, New Jersey.

In 1883 he became a member of the Inland Fisheries Commission of Rhode Island and served on that board until 1910, when he resigned. From March 8, 1906, until his resignation in 1910, he was President of the Rhode Island Fish Commission. He had also served in the Rhode Island State Legislature.

For many years a leader in the business and in the state policies of Rhode Island, he creditably carried important civic responsibilities. As President of the State Fish Commision his sturdy purposefulness demonstrated the identity of science and common sense when applied to the service of the state.

III. Be it resolved that the thanks of the Society be extended to the local committees for their work in preparing the program and for the entertainment provided during the course of this meeting.

On motion duly made and seconded, the above resolutions were passed and approved by the Society.

MR. GRAHAM, of Massachusetts: Mr. President, it seems to me that this is the proper time to consider the question of this Society meeting in conjunction with the Association of Game and Fish Commissioners each year. We have many interests in common and many members belong to both organizations. This year there has been some hitch in the arrangments and the members of the Commissioners' Association feel that they have had too little time for their meetings. I wish to offer the suggestion that a committee be appointed from this Society to confer with the officers of the Commissioners' Association as to time and place of meeting and other matters of interest to both societies, to prevent any misunderstanding in the future.

Moved and seconded that the President, Vice-president and Secretary of the American Fisheries Society form a committee to confer with a similar body of the Association of Game and Fish Commissioners on matters of interest to both societies. Motion carried.

Report of the Committee on Time and Place of Meeting.

PRESIDENT WARD: The Committee on Time and Place of Meeting will now render its report.

MR. ALEXANDER, of Louisiana: Mr. Chairman, I am going to ask the privilege of postponing the report of this committee, because I understand that it is not a unanimous report and I believe that for the harmony of its work this Society's actions should be as unanimous as possible. I also understand that the city I have the honor to represent, New Orleans, has received a majority of the votes of the committee. If this committee will withdraw its report, I am going to ask the consent of the Society to withdraw the invitation of the city of New Orleans for the convention of 1915.

The committee retired for a few moments for further consideration of the question.

MR. JOHN P. WOODS, of Missouri: Mr. Chairman, I represent a majority of the committee as previously divided on this question. But as the gentleman from New

Orleans wishes the majority report to be withdrawn we are glad in the interests of the Society to accede to his request, although it is not a distinct pleasure to do so.

MR. FEARING, of Rhode Island,representing the minority of the committee, then presented the following report:

The Committee on Time and Place of Meeting begs to report that offers to entertain the Society at its 45th annual meeting were received from Atlantic City, Chicago, St. Louis, Detroit, Niagara Falls, Buffalo, Springfield, New Orleans, Oakland and San Francisco. The committee having met after Mr. Alexander's withdrawal of New Orleans as the meeting place for the forty-fifth annual meeting, voted to recommend San Francisco, California, and the time as September 1 to 4, inclusive.

(Signed) DANIEL B. FEARING of Rhode Island,
JOHN P. WOODS, of Missouri,
S. W. DOWNING, of Ohio.

Committee.

MR. ALEXANDER: Mr. Chairman, I move the adoption of the report. Before the motion is put, however, I beg the privilege to state that we in New Orleans looked forward with a great deal of pleasure to entertaining this Society the present year and were much disappointed that we did not have the privilege. At some future date we hope to have that pleasure. The State of Louisiana is, I believe from investigations that have been made, richer in actual resources than any other state in the Union. We have wonderful silver mines yielding twenty millions of dollars annually, we have the greatest salt mines in the western hemisphere, we have six of the greatest oil fields and the greatest gas fields in the United States; we have forty-seven hundred miles of water-ways teeming with choice fishes in great variety and the richest oyster producing territory in the country; we have twenty-eight millions of acres of the richest soil under the sun, with great sugar, cotton and rice fields, and we have the beautiful city of New Orleans. There has been much ignorance and many false impressions with regard to our State in other parts of the country

and we wanted you, who come from all parts of the United States, to visit us and learn something of our people and of our wonderful resources. I felt if I laid these facts before you, you would stand with me in regard to this invitation. However, I believe that this year many of you desire to take advantage of the great opportunity to attend the San Francisco Exposition, and we do not wish for any reason to create antagonism in the ranks of this Society. When you do come we wish you to come freely so that we may have the pleasure of entertaining willing guests, and it is for this reason that I have withdrawn the name of the City of New Orleans for holding the convention of 1915.

PRESIDENT WARD: Mr. Alexander, in the name of the Society, I beg to express to you our appreciation of your remarks. Such broad-minded and generous policies will bring success both to the great State which you represent and to this small, but as we believe, important, American Fisheries Society.

The motion having been made and seconded, it was unanimously voted that the 1915 meeting be held in San Francisco on Sept. 1-4, 1915.

Report of Committee on Weights and Measures of Whitefish.

MR. DOWNING, of Ohio: I have a report on weights and measures. As chairman of this committee I measured and weighed one hundred fish of each sex,—

PRESIDENT WARD: I have understood that the committee as a whole has had no meetings. It occurs to me that the other members might object to the presentation of a report, even by the Chairman, if the matter has not been fully discussed. This is a matter of great importance.

MR. TITCOMB, of Vermont: We are pressed for time at this meeting and this matter should be discussed very fully. I am sure that whatever Mr. Downing would give us would be to the point, but we should not be able to thresh the matter out. I move that the Chairman of this

Committee secure the approval of the other members of the committee, by correspondence, if necessary, and report later.

This motion, being seconded, was unanimously carried.

Report of the Committee on Nominations.

MR. CASSELMAN, of New York: The Committee on Nominations begs to present the following nominations for officers of this Society for the year 1914-15:

President, Daniel B. Fearing, of Rhode Island;

Vice-President, Jacob Reighard, of Michigan;

Recording Secretary, Raymond C. Osburn, of New York.

Corresponding Secretary, Chas. H. Townsend, of New York.

Treasurer, Chas. W. Willard of Rhode Island.

Vice-Presidents of Divisions.

Fish Culture, Dwight Lydell, of Michigan;

Aquatic Biology and Physics, Henry B. Ward, of Illinois.

Commercial Fishing, Jefferson F. Moser, of California;

Angling, H. Wheeler Perce of Illinois;

Protection and Legislation, T. S. Palmer of Washington, D. C.

Executive Committee.

Geo. W. Field, of Massachusetts, Chairman;
L. L. Dyche, of Kansas;
N. R. Buller, of Pennsylvania;
J. Quincy Ward, of Kentucky;
Henry O'Malley, of Washington;
Ernest Schaeffle of California;
John P. Woods, of Missouri.

(Signed) E. S. CASSELMAN,
M. C. MARSH,
EBEN W. COBB,
SEYMOUR BOWER,
JOHN W. TITCOMB,
Committee.

MR. GRAHAM, of Massachusetts: I move that this report be accepted and that the Secretary be instructed to cast one ballot for the entire list.

The motion was seconded and carried, whereupon, the Secretary having cast the ballot, the President declared the gentlemen named to be elected.

President-elect Fearing was introduced and made a brief address.

The Committee on Nominations presented the following recommendation: *Resolved*: That the Vice-presidents of Divisions be required to make a report at each annual meeting.

This was sustained by vote of the Society.

MR. TITCOMB, of Vermont: It may become necessary for a re-adjustment of the time for holding our meeting in order to meet with other societies, or for other reasons. I move a reconsideration in the matter of time of holding the meeting and the absolute determination of the date be left to the Conference Committee after consultation and correspondence.

Motion carried.

The President thereupon declared the meeting adjourned.

In Memoriam

A. S. BICKMORE
T. J. BLAKESLEE
AUSTIN COOK
THOMAS M. DARRAH
THEODORE N. GILL
J. J. HOGAN
E. C. LAMBERT
CHARLES H. MOORE
OVERTON W. PRICE
HENRY T. ROOT